Department of the Air Force
HQ AEDC (AFMC)
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Safety, Health and Environmental Standard

HYDROCARBON FUELS

SCOPE/APPLICATION

This standard establishes requirements and responsibilities for the safe handling and use of hydrocarbon propellant fuels JP-4, JP-5, JP-8, and diesel fuels. Information required for a site safety poster is given in Annex A, Safety Poster for Hydrocarbon Propellant Fuels.

DEFINITIONS

Combustible - The NFPA definition for a combustible liquid is a liquid with a flash point at or above 100 ^{o}F (38 ^{o}C) but below 200 ^{o}F (93.3 ^{o}C).

Distillation - Any of various heat-dependent processes used to purify a complex mixture or substance especially the vaporization of a liquid mixture with subsequent collection of components by distinct cooling to condensation.

Evaporation Rate - The rate at which a material vaporizes from the liquid or solid state when compared to a known material's vaporization rate. The known reference is usually n-butyl acetate with a rate designated as 1.0.

Flammable - The NFPA definition for a flammable liquid is a liquid with a flash point below 100^{o} F.

Flammability Range - Minimum and maximum concentrations of a flammable gas or vapor between which ignition can occur. Concentrations below the lower flammable limit (LFL) are too lean to burn, while concentrations above the upper flammable limit (UFL) are too rich. All concentrations between LFL and UFL are in the flammable range, and special precautions are needed to prevent ignition or explosion.

Grounding - Conducting a connection to position electric circuits or currents at zero potential with respect to the earth to avoid electrical sparks or static electricity.

Inhalation - Entry of a chemical substance to the lungs by breathing.

Ingestion - Swallowing a chemical substance; may inadvertently result from eating, drinking, or smoking in the workplace or with contaminated hands.

Jet Fuel - Turbine Fuel, Aviation. Refined hydrocarbon distillate fuel oils containing additives in accordance with 3.3 MIL-T-5624N and MIL-T-83133C.

Parts Per Million - A measure of concentration of one part in one million parts by volume.

Personal Protective Equipment - Devices or clothing worn to help isolate a worker from direct exposure to hazardous materials. Examples include gloves, respirators, safety gasses, and chemical protective clothing.

Oxidizer - The Department of Transportaion defines an oxidizer or oxidizing material as a substance that yields oxygen readily to cause or enhance the combustion of other materials. Examples include chlorine, chlorate, permanganate and nitrate.

Reactivity - A substance's tendency to undergo chemical reaction either by itself or with other materials with the release of energy.

Solubility - The percentage of a material (by weight) that dissolves in water at ambient temperature.

Specific gravity - The ratio of the density of a substance to the density of a reference substance, at a specific temperature. Water is the reference for solids and liquids while air is the reference for gases. Information is important for fire suppression and spill clean-up.

Stability - The ability of a material to remain unchanged. A material is stable if it remains in the same form under expected and reasonable conditions of storage or use.

STEL - Short Term Exposure Limit - A 15-minute time weighted average exposure which should not be exceeded at any time during a workday and no more than four times during an eight hour day.

TLV - Threshold Limit Value - The Time Weighted Average concentration for a conventional 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

PROPERTIES OF HYDROCARBON PROPELLANT FUELS

Decomposition Products - JP4, 5, & 8 may form toxic decomposition products as a result of burning. Carbon dioxide, carbon monoxide, and other hydrocarbons can be produced.

Incompatibility - Avoid contact with strong oxidizing agents.

Materials Compatibility - These fuels do not attack ferrous or non ferrous metals. Water as an impurity may destroy natural rubber. Neoprene rubber is unaffected.

Reactivity - Chemically, these fuels react only under strong oxidizing conditions of high temperature and pressure. However, they are flammable/combustible and their vapors may form explosive mixtures in air. Water or foam may cause frothing which can be violent and dangerous in the event of fire-fighting.

When hydrocarbon fuels mix with liquid oxygen (an oxidizer) they form a reactive gel that has the potential to explode with great force. Fortunately, oxygen evaporates rapidly from the gel, thus removing the detonation hazard. However, due to the oxygen-rich atmosphere, a serious fire hazard remains until the gaseous oxygen has been diluted.

Solubility - All the mentioned hydrocarbon fuels are insoluble in water. However, they are soluble in many organic solvents and are good solvents for several organic materials.

Stability - Under conditions of standard atmospheric pressure and temperature, hydrocarbon fuels do not change or alter readily.

Chemical and Physical Properties

Properties	Grade JP4	Grade JP5	Grade JP8	Grade JP10	Diesel Fuel	Gasoline	Kerosene
Appearance	Clear to light brown	Clear	Clear	Clear, saybolt color liquid	Amber Liquid	Orange to Bronze liquid	Colorless to yellowish
Odor	Fuel-oil	Fuel-oil	Fuel-oil	Fuel-oil	Fuel-oil	fuel	Odorless - Aromatic
Autoignition Temperature	246 ^{o} C	241 ^{o} C	238 ^{o} C	No data	494 ^{o} F	No data	410 ^{o} F
Boiling Point	130-160 ^{o} F @ 760 mm Hg	350-360 ^{o} F @ 760 mm Hg	350-360 ^{o} F @ 760 mm Hg	360 ^{o} F @ 760 mm Hg	350-660 ^{o} F	25 - 225 ^{o} C	175-325 ^{o} C (347-617 ^{o} C)
Evaporation Rate = ether	slower than	slower than	slower than	slower than	No data	No data	No data
Flammable Limit - %	1.3 - 8	0.6 - 4.6	0.6 - 4.7	No Data	0.7 - 5.0	1.4 - 7.6	0.7 - 5.0
Flash Point, min ^{o} C (^{o} F)	No data	60 (140)	38 (100)	51.6 (125)	38	< -45	38-74 (100-165)
Flash Point - MSDS ^{o} C (^{o} F)	< -1.1 (<30)	60 (140)	37.8 (> 100)	51.6 (125)	130 (min)	< -45 (-49)	120 (min)
Freezing Point max ^{o} C (^{o}F)	-58 (-72)	-46 (-51)	-47 (-53)	No data	No data	No data	No data
Specific Gravity	.751 - .802 @ 60 ^{o} F	.775 - .840 @ 60 ^{o} F	.775 - .840 @ 60 ^{o} F	.93 - .94 @ 60 ^{o} F	0.8	0.7 - 0.8	0.8 @ 20 ^{o} F
Stability	stable	stable	stable	stable	stable @ 1 atm & 70 ^{o} F	stable	stable
Vapor Density (air = 1)	> air	> air	> air	> 1	4 - 5	3 - 4	4.5
Vapor Pressure	129 mm Hg @ 68 ^{o} F	unavailable	unavailable	< 5 mm Hg @ 77 ^{o} F	1-10 mm Hg @ 100 ^{o} F	5 - 16 psi (max) @ 100 ^{o} F	Unknown
Volatility - %	100	100	>99	100	NA	99	NA

Note: Data is taken from military specifications.

HEALTH HAZARDS

Routes of Entry - The primary route of entry for hydrocarbon fuels is by absorption through the skin. Inhalation is also a route of entry for these chemicals.

Eye Contamination - Splashes of hydrocarbon fuel in the eyes produce immediate irritation accompanied by redness, watering of the eyes and blurred vision.

Skin Contamination - Prolonged contact with the skin may cause burning, blistering, drying, and cracking. This effect can lead to secondary infection. The practice of good personal hygiene and prompt removal of soiled clothing (with washing) are key components in prevention of contamination.

Hygiene - Clothing that has been splashed with hydrocarbon fuels must be removed at once and the affected skin areas washed with soap and water, particularly if the contaminant is a leaded fuel. Clothing must be dried and laundered before being worn again. Fuel-soaked clothing must not be placed in lockers or other confined spaces.

Inhalation - Inhalation can result in respiratory and nasal irritation, headache, weakness, nausea, fatigue, unconsciousness and possibly death. Inhalation of more than 1,000 parts per million may result in intoxication similar to, but more severe in nature than, alcohol intoxication.
Ingestion - Ingestion can cause gastrointestinal distress, vomiting and diarrhea. The low viscosity of these materials enables the lungs to readily absorb the fluid if directly swallowed or vomited. Once in the lungs it is difficult to remove. Aspiration into the lungs can cause injury to the lungs and possibly death.

Exposure Limits - Hydrocarbon fuels and their vapors are a mixture of numerous hydrocarbon compounds considered to be indiscriminate petroleum distillates or petroleum hydrocarbons. Benzene may be present in some fuels and should be considered along with the overall vapor concentration when there is potential exposure to hydrocarbon fuels. Allowable exposures are as follows:

FUEL / CHEMICAL	ACGIH TLV	OSHA PEL	STEL	NIOSH REC TWA
JP4				100 mg/cum (10 hrs)
Petroleum Distillate	100 ppm	400 ppm	None	85 ppm
Cyclohexane	300 ppm	300 ppm	None	300 ppm
Benzene*	10 ppm	1 ppm	5 ppm	0.1 ppm
JP5				100 mg/cum (10 hrs)
Petroleum Distillate	100 ppm	400 ppm	None	85 ppm
Additive				
JP8				100 mg/cum (10 hrs)
Petroleum Distillate	100 ppm	500 ppm	None	85 ppm
Xylene Mix	100 ppm	100 ppm	150 ppm A	100 ppm
Naphthalene	10 ppm	10 ppm	15 A	10 ppm
Biphenyl	0.2 ppm		NA	NA
JP10				
Exo-tetrahydro Dicyclopentadiene	NA	NA	NA	NA
Diesel				
Petroleum Hydrocarbons	100 ppm	500 ppm	None	85 ppm
Sulfur	NA	NA	NA	NA
Benzene*	10 ppm	1 ppm	5 ppm	0.1
Gasoline**	300 ppm	300 ppm	500 ppm A&O	NA
Methyl-Tert Butyl Ether	40 ppm	NA	NA	NA
Toluene	100 ppm	100 ppm	150 ppm A&O	100 ppm
Benzene*	10 ppm	1 ppm	5 ppm	0.1
Xylene-M	100 ppm	100 ppm	150 ppm A&O	100 ppm
Hexane-N	50 ppm	50 ppm	NA	50 ppm
Cyclohexane	300 ppm	300 ppm	NA	300 ppm
Xylene-O	100 ppm	100 ppm	150 ppm A&O	100 ppm
Ethyl Benzene	100 ppm	100 ppm	125 ppm A&O	100 ppm
Xylene-P				100 ppm
Kerosene				100 mg/m^3
Saturated Hydrocarbons	NA	NA	NA	NA
Unsaturated Hydrocarbons	NA	NA	NA	NA
Aromatic Hydrocarbons	NA	NA	NA	NA
Sulfur	NA	NA	NA	NA
Benzene*	10 ppm	1 ppm	5 ppm	0.1

Stoddard Solvent is used for ACGIH - TLV exposure limit for petroleum distillate

* - Suspected human carcinogen A - ACGIH

** - Animal carcinogen O - OSHA

FIRE AND EXPLOSION HAZARDS

Fire and Explosion Hazards - These hazards arise through leakage and spillage, accumulation of vapor in low or enclosed areas, improper grounding, ignition from an external source, and relaxed enforcement of fire regulations.

Vapors - The vapors of these materials are volatile to highly volatile. The vapors are heavier than air causing them to travel on the ground. The vapors can be ignited by spark, open flame, heaters, electric motors, pilot lights, or static electricity at locations distant from the material handling point. The risk of explosion increases as air dilutes the vapors when a tank is opened. The air will dilute the vapors to create a hazard within the tank itself. Vapors can exist in empty containers in amounts to create explosive conditions.

Flammability - Gasoline products are extremely flammable due to their volatility under normal atmospheric conditions and below zero degrees Fahrenheit and due to their expansion of 0.07 percent for each degree Fahrenheit. A mixture of gasoline vapor to air in the ratio of 1 to 7.6 is combustible when heated to ignition temperature. These mixtures can also be ignited by contact with any material having a temperature over 540 ^{o} F.

Jet fuel products (i.e. JP4) have the same expansion as gasoline and form explosive vapors in the space above the liquid in storage tanks in the range of -10 to 0 ^{o} F. Jet fuels are more subject to buildup of static electric charge than gasoline due to their low conductivity.

Fuel Oils are stable at normal temperatures and evaporation is negligible. Fuel oil vapors are combustible when mixed with the proper ratio of air and heated to the ignition temperature.

Flash Point - All hydrocarbon fuels present a serious fire hazard at temperatures above their flashpoints.

Flammable Range - The range of flammability for these fuels is listed in the Chemical and Physical Properties Table. This range will be wider when oxygen concentrations exceed normal atmospheric concentration.

Sludge - Sludge and other materials can release vapors creating an explosive atmosphere.

Ignition sources - Principal sources include stray currents, open flames, and sparks.

Venting - Extra precautions must be taken while venting a tank to ensure the vapors do not contact an ignition source several hundred feet from the tank. This could cause a flashback creating violent repercussions.

FIRE PREVENTION

Fire requires three conditions to be present. This is known as the fire triangle. Fire is not supported if any one of the three conditions is absent. 1) Petroleum vapors, 2) the mixture of vapor to air in proper proportions to support combustion, 3) proper proportions of vapor to air raised to its ignition temperature or exposed to an ignition source. Practicality prevents controlling vapor to air ratios, eliminating air, or controlling temperatures. Therefore, fire and explosion prevention relies on complete elimination of ignition sources.

Liquid oxygen and fuel react violently to produce spontaneous combustion. It is imperative that liquid oxygen and petroleum fuels are stored separately.

Prevention is furthered by providing proper ventilation where vapors could gather; preventing spills and leaks; forbidding open flames within 50 feet of facilities; providing static grounding; eliminating welding, cutting or grinding until proper venting and purging has occurred; immediate disposal of saturated waste or rags; and good hygiene. If a small spill occurs prevention is furthered by covering spills with sand or earth, providing ventilation, diverting from sanitary or storm sewer systems, and removing ignition sources. Vehicles should not be moved from an area where a spill has occurred until all vapors have been removed.

FIRE FIGHTING PROCEDURES

Fire blankets, safety showers, and means of extinguishment must be stored in easily accessible locations.

Unloading, storage, pumping or dispensing facilities must be provided with 'Class B' portable fire extinguishers. Extinguishing media should be regular foam, carbon dioxide or dry chemical. Water or foam may cause violent frothing which can endanger extinguisher operator.

Areas must be equipped with safety showers and eye baths. See AEDC Safety Standard, B8 Safety Showers & Eye Fountains.

Oxidizers, open flames, sparks, and static electricity must NOT be present in or near fuel storage areas.

Remote locations must have distinct signs designating telephones or fire alarms.

General inspections and maintenance of automatic fire suppression systems and safety equipment must be conducted to ensure they are in working order.

Training in extinguishing fires should be provided to maintenance and operating personnel.

Halon, water or other approved media should be used as means of extinguishment depending on the type of fire. Grass, dome of tank, ground, tank vent or manhole, pipeline, open tank, and pit fires are in this category.

Do not use water or AFFF extinguishers on electrical fires due to the conductivity of these medias. Personnel would be in danger of electrical shock.

MAINTENANCE OF PETROLEUM SYSTEMS

Fire Hazards - Fire protection for facilities should be kept in a state of constant readiness. (AFR 92-1)

Bonding and Grounding - All components in the fuel system must be bonded and grounded to drain off static charges and stray electrical currents that can discharge in the form of an electric arc. Detailed procedures can be found in chapter 1 section F of AFM 85-16(C3). Also TO 00-25-172 gives additional guidance on static electricity hazards.

Signs and Markings - All signs must be conspicuously mounted, clearly legible, and must clearly state the objective(s). Identification banding or coding must be according to MIL-STD-161 and must comply with AFOSH Standards and TO 37-1-1.

Housekeeping - Areas should be kept free of all unneeded materials. It is the individual's responsibility to correct or report any situation that would prevent safe operations.

Electrical Equipment - Only explosion proof electrical equipment should be used in areas where there are explosive vapors or volatile fuels as set by the National Electrical Code and HQ USAF. Each project should be inspected to determine if requirements have been met.

Hoses - Transfer and cargo hoses must be cleaned and stored out of the sun and inspected and tested according to chapter 10, AFM 85-16(c3).

Location - Hydrocarbon fuels should be stored and handled in well-ventilated areas. Storage should be remote from oxidizers. See AFR 127-100, Explosive Safety Standard.

Personal Protective Equipment - Operating personnel must wear the applicable protective clothing and respirators. Persons engaged in operations involving handling or transfer of the hydrocarbon fuels must wear goggles or face shields, neoprene or nitrile gloves and impervious clothing boots.

Water Supply - Storage and handling areas should have an adequate water supply for fire control and emergency showers.

Written Procedure - A written operating procedure should be available to workers involved.

STATIC-ELECTRICAL GROUNDING

To reduce static electricity, grounding and bonding is essential while handling and dispensing hydrocarbon fuels. Electrostatic charges are complex and several factors contribute to it that includes equipment, rubber tires, overhead dispensing method, normal flow through filter separator, ionized contaminants due to settling, ionized suspended particles in dry air and low temperatures, non-cotton clothing, and lightning. Jet fuels become electrostatically charged due to their low conductivity. The charges can produce enough electrical energy to produce an ignition which can result in a fire or explosion above the liquid surface.

PREVENTION OF STATIC ELECTRICITY

Reducing static electricity can be accomplished by allowing electricity generated to equalize its charge to ground potential. Proper bonding and grounding is crucial to the reduction of charge. All static grounds should have a resistance of less than 10,000 ohms. Grounding criteria can be found in AFM 88-12.

Storage Tanks - Tanks that rest on the earth do not require grounding rods unless plastic liners are used between soil and oil sand. Floating roofs must be bonded to the tank walls. Ladders must be bonded.

Transfer - Attaching grounding wires to the vehicle must be done before bonding to the grounding rod. Before making and breaking connections, bonding wire should connect the two components. Tank cars and trucks require bonding before dome covers or hatches/outlet valves are opened or hose connections are made. Fillstand grounding details are outlined in section G, chapter 10 of TO 00-25-172.

Agitation - Surface agitation should be avoided by keeping initial flow under three feet per second until roof is afloat or the fill pipe is submerged. Fuel discharge should be horizontal.

Contaminants - Contaminants should be removed from fuel before it enters a tank. Filter separators and air eliminators must be grounded before use.

Clothing, Timing and Grounding - Personnel will wear only cotton or 50% cotton clothing and will not be allowed on top of a tank for 30 minutes after transfer either way. Personnel will ground themselves by holding a coin in the bare hand or touching the tank with the bare hand before opening access manways.

Relaxation - The relaxation or release of energy in fuel occurs within minutes or it can take hours. Any visual glowing or audible cracking sounds of the fuel is a warning and fueling should be shut down.

Copper - Copper should not be used in the grounding system to eliminate corrosion by steel/copper contact.

ELECTRICAL CURRENTS AND PREVENTION

Electrical currents are more dangerous than static charges due to the potential for continuous sparking instead of a brief spark. They originate in wiring, appliances, generators and transmission systems. Grounding is needed to bring all components to equal electrical potential to prevent sparking or arcing.

Electrical Equipment - Only explosion proof electrical equipment should be used in areas where there are explosive vapors or volatile fuels as set by the National Electrical Code and HQ USAF. Each project should be inspected to determine if requirements have been met.

Electric Motors - Explosion proof motors must be inspected before installation and use in petroleum storage and dispensing systems. This includes fans, water coolers, tools and switches.

Stray currents flow through paths other than their intended circuits or are extra currents in the earth. The main hazard for these types of currents is from arcs that can ignite fuel or fuel/air mixtures.

Stray currents - Bonding and grounding is used to direct stray currents into the earth without an arc.

Transfer - Railroad spurs must be insulated from the main line rails during tank car transfer. Truck fillstand grounding must be attached to a permanent structure and be interconnected to an existing approved ground.

Piping - Removal of pipes, valves or meters which interrupts the continuity of a system requires a bonding jumper to be installed around the component to avert an arc.

GENERAL OPERATION AND INSPECTION OF INSTALLED FUEL STORAGE AND DISPENSING SYSTEMS

Technical Manual T.O. 37-1-1 General Operation and Inspection of Installed Fuel Storage and Dispensing Systems gives operating procedures for fuel receipt, transfer, storage and issue. These guidelines cover fire protection, frozen valves, transfer connections, filling bulk storage, ignition hazards, pumps, product settling, tank cleaning, loading, and hydrant issues. Inspection procedures and reporting are outlined to identify deficiencies or maintenance needs which can compromise the safe and efficient operation of the fuel system. Additional policies can be found in AFM 85-16. Some warnings not found in AFM 85-16 are outlined below.

Manpower - A two person policy is required for most hydrocarbon fuel handling operations.

Danger Signs - Fire protection danger signs, “No Open Flame or Ignition Source Beyond This Point” shall be posted at bulk storage and 50 feet from diked areas, tank vents, low point drains, and lateral control pits.

Valves - Open flames or heating elements cannot be used to thaw frozen valves.

Receipt - Simultaneous receipt is not authorized unless all tanks are equipped with high level alarms or shut off valves.

Sludge - Sludge or residual fuel is not allowed to be pumped through the manifold/transfer line.

Pumps - Internal combustion engine driven reciprocating open diaphragm pumps (Mud Hog) are prohibited. Substitute pumps are allowed by Class I, Division I, Group D, National Fire Code and MIL-HDBK-201.

Gauge - Make certain gauging tape is in contact with the gauging hatch during insertion and removal to prevent arcing.

FUEL, WATER AND LUBRICANT DISPENSING EQUIPMENT

Technical Order T.O. 37A-1-101 contains general instructions for operation and inspection of equipment installed on mobile fuel dispensing equipment and for certain installed systems. Truck operations performed at storage facilities are provided. This order covers fuel servicing nozzles, filters and strainers, fuels mobile/fuels mobility support equipment, and inspection, testing & maintenance for all equipment (hoses, couplers, regulators, strainers, valves, nozzles). Warnings and cautions are included in this technical order which is considered essential to the protection of personnel and property. General safety precautions are included and are as follows:

Jewelry - Rings, watches or other metallic objects which could cause shock or burns must not be worn.

Compressed Air - Air must not be directed toward persons. Pressure should be less than 30 PSIG and used with personal protective equipment and chip guarding.

Dangerous Pressure - Connections must be tight and compatible with pressure applied. Personnel must be shielded or removed from location to prevent injury if connections failed.

Personal Protective Equipment - Bioenvironmental Engineering or the Industrial Hygiene office will determine protection.

Cleaners/Chemicals - Precautions must be taken if using materials in petroleum storage or operational areas. Consult Bioenvironmental Engineering or Industrial Hygiene office for ventilation and PPE requirements.

Confined Spaces/Crawl Spaces - Personnel entering these spaces will comply with AFOSH 127-25 and AEDC Safety Standard B5.

CONTAINER SPECIFICATIONS

Hydrocarbon fuels should be stored in approved drums or tanks. Portable and permanent containers should have vent valves to relieve pressure build-up.

All containers must be properly labeled. See AEDC Safety Standard B9, Container Labeling.

All drums must be stored on their side.

Fuel containers may be hazardous when emptied. Use all precautions when handling emptied containers due to liquid or vapor residues.

SPILL REQUIREMENTS FOR HYDROCARBON FUELS

No single technique is suitable for every situation. Response should be tailored for specific area requirements, with input from the Fire Department, Contractor Safety and Environmental staffs. Emergency response for spills falls into three categories depending on individual spill circumstances. Predominant techniques available include application of sorbents, foam or water flushing. These requirements should be included in Local Emergency Response Procedures. See Safety Standard E17, Oil and Hazardous Substances Spill Response for a complete outline of actions and response to be taken by all groups or individuals at AEDC.

Spills, Leaks and Decontamination - Procedures and equipment are planned so that the possibility of spills of both fuel and oxidizers in the same place is held to a minimum. But, in the occurrence of a fire or spill, procedures are outlined below.

- IF SAFE, Stop the spill - If a spill occurs, operating personnel should stop the spill at the source to prevent reaching drains or streams. In the event of a fire or spill involving the mixing of liquid oxygen and liquid fuels, whether or not ignition occurs, operating personnel must not attempt to fight the fire, but evacuate and isolate the area involved.

- Notify the Operations Center - Call extension 7752 who will call the Fire Department.

- Turn it over - Engineering Services and Fire Protection handle further control of fires that involve both fuels and liquid oxygen.

- Persons entering unconfined areas where there is gross spill of fuels must wear appropriate respiratory protection and neoprene rubber boots. An air-purifying respirator (APR) using organic cartridges or an organic vapor gas mask may be acceptable in spill situations if in an unconfined area. If a spill or leak has

occurred in a confined space or poorly ventilated area, a self-contained breathing apparatus (SCBA) or an air-supplied respirator is required.

PERSONAL PROTECTIVE EQUIPMENT

Hand Protection - When handling fuels, neoprene or Viton gloves should be worn.

Head, Face, and Body Protection - For routine operations, no special clothing is required. Goggles or a face shield should be worn if splashing of fuel is likely to occur. Tank cleaners require special equipment as specified in AEDC Safety Standard B5, Confined Spaces.

Respiratory Protection - The type of respiratory protective equipment to be used varies, depending on conditions. An air-purifying respirator (APR) using organic cartridges or an organic vapor gas mask may be acceptable in spill situations in an unconfined area. If a spill or leak has occurred in a confined space or poorly ventilated area, a self-contained breathing apparatus (SCBA) or an air-supplied respirator is required. See Safety Standard B5, Confined Spaces. Contractor safety should be consulted when doubt exists about the type of respiratory protection necessary for a particular operation. See Safety Standard F4, Respiratory Protection, for a detailed scope.

REFERENCES

-AFR 127-100
-MIL-T-5624N
-MIL-T-83133C
-AFM 85-16
-TO 37-1-1
-TO-37A-1-101
-CFR 1910.1200
-Handbook of Aviation Fuel Properties, Coordinating Research Council, Inc.